dc-304666°FORM PTO-1390 (REV 11-2000) TRADEMARK OFFICE — U.S. DEPARTMENT OF COMMERCE PATENT AND

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. § 371

ATTORNEY'S DOCKET NUMBER: 449122022000

U.S. APPLICATION NO. (If known, see 37 CFR 1.5): 10/070254 Not yet assigned

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE00/02976	August 31, 2000	September 3,1999

TITLE OF INVENTION

TRANSMISSION SYSTEM AND METHOD FOR MATCHING A RIF-PARAMETER IN ABR-TRAFFIC

APPLICANT(S) FOR DO/EO/US

Herbert HEISS

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application under PCT Article 19 (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. ☒ Other items: 1) Application Data Sheet; 2) Int'l Search Report; 3) IPER; 4) Return receipt postcard.

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on March 4, 2002.

Melissa Garton

Melissa Garton

dc-305260

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY DOCKET NO.
Not yet assigned 10/070254	PCT/DE00/02976	449122022000

21. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):

	CALCULATIONS PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO $1,040.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO $890.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO $740.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provision of PCT Article 33(1)-(4) $710.00	
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) $100.00	

			ENTER APPROPRIATE BASIC FEE AMOUNT =	$890.00	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				$0	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	- 20 =		x $18.00	$0	
Independent claims	- 3 =		x $84.00	$0	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ $280.00	$0	
			TOTAL OF ABOVE CALCULATIONS =	$890.00	
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by ½.				$0	
			SUBTOTAL =	$890.00	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).			+	$0	
			TOTAL NATIONAL FEE =	$890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00 per property**			+	$40.00	
			TOTAL FEES ENCLOSED =	$930.00	
				Amount to be refunded:	**$**
				charged:	**$**

a. ☒ Please charge my **Deposit Account No. 03-1952** (referencing Docket No. 449122022000) in the amount of $930.00 to cover the above fees. A duplicate copy of this sheet is enclosed.

b. ☒ The Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment to **Deposit Account No. 03-1952** (referencing Docket No. 449122022000).

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Kevin R. Spivak
Morrison & Foerster LLP
2000 Pennsylvania Avenue, N.W.
Washington, D.C. 20006-1888

SIGNATURE

Kevin R. Spivak
Registration No. 43,148

March 4, 2002

CERTIFICATE OF HAND DELIVERY

I hereby certify that this correspondence is being hand filed with the United States Patent and Trademark Office in Washington, D.C. on March 4, 2002.

Melissa Garton

Melissa Garton

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Herbert HEISS

Serial No.: Not yet assigned

Filing Date: March 4, 2002

For: TRANSMISSION SYSTEM AND METHOD FOR MATCHING A RIF-PARAMETER IN ABR-TRAFFIC

Examiner: Not yet assigned

Group Art Unit: Not yet assigned

PRELIMINARY AMENDMENT

BOX PCT
Commissioner for Patents
Washington, D.C. 20231

Sir:

Prior to examination on the merits, please amend this application as follows:

In the Claims:

What is claimed is:

2. (Amended) The method as claimed in claim 1, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated or determined.

3. (Amended) The method as claimed in claim 2, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated in the intermediate station with the aid of the incoming signaling message.

4. (Amended) The method as claimed in claim 2, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated at the intermediate station with the aid of the outgoing signaling message.

5. (Amended) The method as claimed in claim 2, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is determined on the basis of experimental values in accordance with a prescribed link.

6. (Amended) The method as claimed in claim 1, characterized in that the value RIF_sig_egress, which specifies the power n of the defined RIF value $RIF = 2^n/2^{15}$ and is forwarded by the intermediate station, is smaller than or equal to the value RIF_sig_ingress that is received by the intermediate station in the signaling message.

7. (Amended) The method as claimed in claim 1, characterized in that if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, the value RIF_sig_egress that is forwarded by the intermediate station is equated to the smaller of the two values of RIF_sig_ingress and Max_RIF.

8. (Amended) The method as claimed in claim 1, characterized in that the value RIF_sig_egress that is forwarded by the intermediate station is equated to 0 if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor \leq 0$, in accordance with $(FRTT*PCR)^2 > RIF\_const*Nrm/2$.

9. (Amended) The method as claimed in claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station is reduced by two during a further call setup via the same link and given a doubling of the peak cell rate (PCR) if, for an invariable RIF_sig_ingress, before the doubling of the peak cell rate $RIF\_sig\_egress < RIF\_sig\_ingress$ and $Max\_RIF > RIF\_sig\_egress \geq 2$, and other parameters are unchanged.

10. (Amended) The method as claimed in claim 9, characterized in that the value RIF_sig_egress that is forwarded by the intermediate station is reduced by two when the FRTT value is twice as large in a further connection and other parameters are unchanged, if, for an invariable RIF_sig_ingress, $RIF\_sig\_egress < RIF\_sig\_ingress$ and $Max\_RIF > RIF\_sig\_egress \geq 2$.

11. (Amended) The method as claimed in claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station increases by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling RIF_sig_egress < RIF_sig_ingress and RIF_sig_egress < Max_RIF.

12. (Amended) The method as claimed in claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station when RIF_sig_ingress and Nrm do not vary remains unchanged given a change in the peak cell rate (PCR) and the sum of the delays (FRTT) in such a way that the product FRTT*PCR does not vary.

13. (Amended) The method as claimed in claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station when RIF_sig_ingress does not vary remains unchanged given a change in parameters other than the peak cell rate (PCR), the sum of the delays (FRTT) and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device.

14. (Amended) The method as claimed in claim 1, characterized in that the intermediate station determines the value RIF_sig_egress using the following formulas:

$$RIF\_switch = \min(\max(0, \lfloor \log_2(RIF\_const * Nrm / (PCR\_egress * FRTT\_egress)^2) \rfloor), Max\_RIF)$$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

$$RIF\_sig\_egress = \min(RIF\_switch, RIF\_sig\_ingress),$$

where RIF_sig_ingress is the value that the intermediate station receives.

15. (Amended) The method as claimed in claim 1, characterized in that for both directions of the connection i the calculation of RIF_sig_egress is executed analogously with the aid of the parameters associated with the respective direction.

17. (Amended) The transmission system as claimed in claim 16, characterized in that a program module that estimates or determines the value of the peak cell rate (PCR) and/or the sum of the delays (FRTT) is provided in the intermediate station.

18. (Amended) The transmission system as claimed in claim 16, characterized in that a program module that determines the value of the peak cell rate (PCR) and/or the sum of the delays (FRTT) on the basis of experimental values in accordance with a prescribed link is provided in the intermediate station.

19. (Amended) The transmission system as claimed in claim 16, characterized in that a memory is present in the intermediate station.

20. (Amended) The transmission system as claimed in claim 16, characterized in that present in the intermediate station is a program module that, if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, equates the value RIF_sig_egress that is forwarded by the intermediate station to the smaller of the two values of RIF_sig_ingress and Max_RIF.

21. (Amended) The transmission system as claimed in claim 16, characterized in that present in the intermediate station is a program module that equates the value RIF_sig_egress that is forwarded by the intermediate station to 0 if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor \leq 0$, in accordance with $(FRTT*PCR)^2 > RIF\_const*Nrm/2$.

22. (Amended) The transmission system as claimed in claim 16, characterized in that provided in the intermediate station is a program module that during a further call setup over the same link and given a doubling of the peak cell rate (PCR) reduces the value of RIF_sig_egress that is forwarded by the intermediate station by 2 if, for an invariable

RIF_sig_ingress, before the doubling of the peak cell rate RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2, and other parameters are unchanged.

23. (Amended) The transmission system as claimed in claim 16, characterized in that provided in the intermediate station is a program module that, when the value FRTT in a further connection is twice as large and other parameters are unchanged, reduces the value RIF_sig_egress that is forwarded by the intermediate station by two if, for an invariable RIF_sig_ingress, RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2.

24. (Amended) The transmission system as claimed in claim 16, characterized in that provided in the intermediate station is a program module that increases the value of RIF_sig_egress that is forwarded by the intermediate station by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling RIF_sig_egress < RIF_sig_ingress and IF_sig_egress < Max_RIF.

25. (Amended) The transmission system as claimed in claim 16, characterized in that provided in the intermediate station is a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress and Nrm do not vary, given a change in the peak cell rate (PCR) and the sum of the delays (FRTT), in such a way that the product FRTT*PCR does not vary.

26. (Amended) The transmission system as claimed in claim 16, characterized in that provided in the intermediate station is a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress does not vary, given a change in parameters other than the peak cell rate (PCR), the sum of the delays (FRTT) and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device.

27. (Amended) The transmission system as claimed in claim 16, characterized in that provided in the intermediate station is a program module that determines the value RIF_sig_egress using the following formulas:

RIF_switch =

$$\min(\max(0, \lfloor \log_2(RIF\_const*Nrm/(PCR\_egress*FRTT\_egress)^2) \rfloor), Max\_RIF)$$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

RIF_sig_egress = min(RIF_switch, RIF_sig_ingress),

where RIF_sig_ingress is the value that the intermediate station receives.

REMARKS

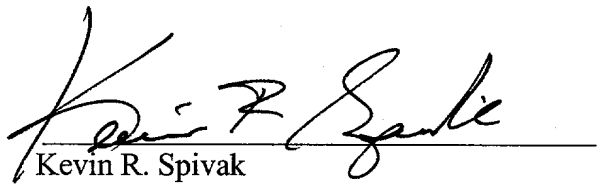
The above amendments have been made to remove multiple dependency from the claims.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**".

In the unlikely event that the transmittal letter is separated from this document and the Patent Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952** referencing docket no. 449122022000. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: March 4, 2002



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

For the convenience of the Examiner, the changes made are shown below with deleted text in strikethrough and added text in underline.

In the Claims:

~~Patent Claims~~

What is claimed is:

2. (Amended) The method as claimed in ~~the preceding~~ claim 1, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated or determined.

3. (Amended) The method as claimed in ~~the preceding~~ claim 2, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated in the intermediate station with the aid of the incoming signaling message.

4. (Amended) The method as claimed in ~~one of the preceding claims 2 to 3~~ claim 2, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated at the intermediate station with the aid of the outgoing signaling message.

5. (Amended) The method as claimed in ~~one of the preceding claims 2 to 4~~ claim 2, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is determined on the basis of experimental values in accordance with a prescribed link.

6. (Amended) The method as claimed in ~~one of the preceding claims 1 to 5~~ claim 1, characterized in that the value RIF_sig_egress, which specifies the power n of the defined RIF value $RIF = 2^n/2^{15}$ and is forwarded by the intermediate station, is smaller than or equal to the value RIF_sig_ingress that is received by the intermediate station in the signaling message.

7. (Amended) The method as claimed in ~~one of the preceding claims 1 to 6~~ claim 1, characterized in that if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, the value

RIF_sig_egress that is forwarded by the intermediate station is equated to the smaller of the two values of RIF_sig_ingress and Max_RIF.

8. (Amended) The method as claimed in ~~one of the preceding claims 1 to 7~~ claim 1, characterized in that the value RIF_sig_egress that is forwarded by the intermediate station is equated to 0 if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor \leq 0$, in accordance with $(FRTT*PCR)^2 > RIF\_const*Nrm/2$.

9. (Amended) The method as claimed in ~~the preceding~~ claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station is reduced by two during a further call setup via the same link and given a doubling of the peak cell rate (PCR) if, for an invariable RIF_sig_ingress, before the doubling of the peak cell rate RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2, and other parameters are unchanged.

10. (Amended) The method as claimed in ~~one of the preceding claims 8 to 9~~ claim 9, characterized in that the value RIF_sig_egress that is forwarded by the intermediate station is reduced by two when the FRTT value is twice as large in a further connection and other parameters are unchanged, if, for an invariable RIF_sig_ingress, RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2.

11. (Amended) The method as claimed in ~~one of the preceding claims 8 to 10~~ claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station increases by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling RIF_sig_egress < RIF_sig_ingress and RIF_sig_egress < Max_RIF.

12. (Amended) The method as claimed in ~~one of the preceding claims 8 to 11~~ claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station when RIF_sig_ingress and Nrm do not vary remains unchanged given a change in the peak cell

rate (PCR) and the sum of the delays (FRTT) in such a way that the product FRTT*PCR does not vary.

13. (Amended) The method as claimed in ~~one of the preceding claims 8 to 12~~ claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station when RIF_sig_ingress does not vary remains unchanged given a change in parameters other than the peak cell rate (PCR), the sum of the delays (FRTT) and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device.

14. (Amended) The method as claimed in ~~one of the preceding claims 1 to 13~~ claim 1, characterized in that the intermediate station determines the value RIF_sig_egress using the following formulas:

RIF_switch =

$\min(\max(0,\lfloor \log_2(RIF\_const*Nrm/(PCR\_egress*FRTT\_egress)^2) \rfloor), Max\_RIF)$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

RIF_sig_egress = min(RIF_switch, RIF_sig_ingress),

where RIF_sig_ingress is the value that the intermediate station receives.

15. (Amended) The method as claimed in ~~one of the preceding claims 1 to 14~~ claim 1, characterized in that for both directions of the connection i the calculation of RIF_sig_egress is executed analogously with the aid of the parameters associated with the respective direction.

17. (Amended) The transmission system as claimed in ~~the preceding~~ claim 16, characterized in that a program module that estimates or determines the value of the peak cell rate (PCR) and/or the sum of the delays (FRTT) is provided in the intermediate station.

18. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 17~~ claim 16, characterized in that a program module that determines the value of the peak cell rate (PCR) and/or the sum of the delays (FRTT) on the basis of experimental values in accordance with a prescribed link is provided in the intermediate station.

19. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 18~~ claim 16, characterized in that a memory is present in the intermediate station.

20. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 19~~ claim 16, characterized in that present in the intermediate station is a program module that, if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, equates the value RIF_sig_egress that is forwarded by the intermediate station to the smaller of the two values of RIF_sig_ingress and Max_RIF.

21. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 20~~ claim 16, characterized in that present in the intermediate station is a program module that equates the value RIF_sig_egress that is forwarded by the intermediate station to 0 if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor \leq 0$, in accordance with $(FRTT*PCR)^2 > RIF\_const*Nrm/2$.

22. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 21~~ claim 16, characterized in that provided in the intermediate station is a program module that during a further call setup over the same link and given a doubling of the peak cell rate (PCR) reduces the value of RIF_sig_egress that is forwarded by the intermediate station by 2 if, for an invariable RIF_sig_ingress, before the doubling of the peak cell rate $RIF\_sig\_egress < RIF\_sig\_ingress$ and $Max\_RIF > RIF\_sig\_egress \geq 2$, and other parameters are unchanged.

23. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 22~~ claim 16, characterized in that provided in the intermediate station is a program module that, when the value FRTT in a further connection is twice as large and other parameters are

unchanged, reduces the value RIF_sig_egress that is forwarded by the intermediate station by two if, for an invariable RIF_sig_ingress, RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2.

24. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 23~~ claim 16, characterized in that provided in the intermediate station is a program module that increases the value of RIF_sig_egress that is forwarded by the intermediate station by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling RIF_sig_egress < RIF_sig_ingress and IF_sig_egress < Max_RIF.

25. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 24~~ claim 16, characterized in that provided in the intermediate station is a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress and Nrm do not vary, given a change in the peak cell rate (PCR) and the sum of the delays (FRTT), in such a way that the product FRTT*PCR does not vary.

26. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 25~~ claim 16, characterized in that provided in the intermediate station is a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress does not vary, given a change in parameters other than the peak cell rate (PCR), the sum of the delays (FRTT) and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device.

27. (Amended) The transmission system as claimed in ~~one of the preceding claims 16 to 26~~ claim 16, characterized in that provided in the intermediate station is a program module that determines the value RIF_sig_egress using the following formulas:

$$RIF\_switch = \min(\max(0, \lfloor \log_2(RIF\_const * Nrm / (PCR\_egress * FRTT\_egress)^2) \rfloor), Max\_RIF)$$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

$$RIF\_sig\_egress = \min(RIF\_switch, RIF\_sig\_ingress),$$

where RIF_sig_ingress is the value that the intermediate station receives.

Description

Transmission system and method for matching a RIF parameter in ABR traffic

The invention relates to a transmission system and a method for matching an RIF parameter (RIF = Rate Increase Factor) in ABR traffic in an ATM data network with a multiplicity of connections, at least one data source (transmitter), at least one data sink (receiver) and, between the data source and data sink, at least one intermediate station being present, control cells and ATM cells being transmitted during data transmission, and the control cells containing at least the fields CI (CI = Congestion Indication), NI (NI = No Increase) and ECR (ECR = Explicit Cell Rate).

A multiplicity of types of connection are defined in the case of connections via which information is transmitted using an asynchronous transfer mode (ATM). Connections via which information is transmitted at a constant bit rate differ from connections with the aid of which information is transmitted at a variable bit rate. An example of the latter type of connection is ABR (ABR = Available Bit Rate).

ABR is concerned with connections via which information of low priority is transmitted between a data source (transmitter) and a data sink (receiver).

For this purpose, control cells are inserted in a time sequence into the stream, emanating from the data source, of ATM cells belonging to a connection. The ATM cells are fed to the data sink together with the control cells via at least one intermediate stations. The control cells are fed back again to the data source from the data sink.

The intermediate station extracts the control cells from the cell stream. These control cells are forwarded with call-related data and data described on the current state of the link sections. The transmission rate can be matched with the aid of this update. A parameter that exerts influence on the transmission rate is RIF (RIF = Rate Increase Factor).

The control cells control an allowed cell rate (ACR = Allowed Cell Rate) of an ABR data source. These control cells contain different fields, for example the field ECR (ECR = Explicit Cell Rate), which specifies the explicit cell rate, the field CI (CI = Congestion Indication), which indicates whether data congestion is present, and the field NI (NI = No Increase), which indicates a risk of data accumulation.

A control cell leaves the data source with the field information CI = 0, NI = 0 (there is no data congestion). Furthermore, the explicit cell rate is set to the value of the peak cell rate (PCR = Peak Cell Rate) which specifies the rate that the transmitting device can never exceed.

When a control cell returns to the data source and carries in itself the information that there is no data congestion, and the allowed cell rate is lower than the explicit cell rate (ACR < ECR), the data source can increase the value of ACR. This is performed by increasing the value ACR by the value PCR*RIF, although not beyond the value of the explicit cell rate (ECR).

According to the document ATM Forum Technical Committee, Traffic Management Specification 4.0, af-tm-0056.000, April 1996, the RIF parameter has the form of:

$$RIF = 2^n/2^{15}, \text{ with } n = 0,1,...15 \qquad (1)$$

For n = 15, RIF reaches a maximum at RIF = 1. For n = 0, RIF reaches a minimum at RIF = $1/2^{15}$.

According to the ATM Forum Signalling Specification 4.0, af-sig-0061.000, June 1996, the parameter n is transmitted in the signaling message during a call setup. After recasting the equation (1), this parameter has the form of:

$$n = RIF\_sig = \log_2(RIF*2^{15}) \qquad (2)$$

The parameter n becomes 15 for RIF = 1 and 0 for RIF = $1/2^{15}$.

Moreover, a supplement to ATM Forum Signalling Specification 4.0 defines that the value of RIF_sig may never be increased by an intermediate station. RIF_sig either remains the same or becomes smaller.

It is to be noted that for an ABR connection an RIF parameter exists for data transmission in the direction from the data source to the data sink (that is to say the forward direction, denoted by fw = forward), and one exists in reverse (backward direction, bw = backward).

Values in the signaling message which reach the intermediate station are denoted by "ingress", and values which leave the intermediate station, that is to say which are forwarded by the intermediate station, are denoted by "egress".

So far, constant values have been assumed for RIF, that is to say 1/16, for example. The inventor has realized that these constant values are not suitable for optimum utilization of capacity.

It is therefore an object of the invention to develop a method for matching an RIF parameter (RIF = Rate Increase Factor) in ABR traffic so as to achieve optimization of the utilization of capacity in ABR traffic. Moreover, a transmission system is to be developed for applying the method according to the invention.

The object of developing a method is achieved by means of the features of the first method claim, while the object of developing a transmission system is achieved by the features of the first device claim.

In accordance with the first method claim, it is proposed that the method for matching an RIF parameter (RIF = Rate Increase Factor) in ABR traffic in an ATM data network with a multiplicity of connections, at least one data source (transmitter), at least one data sink (Receiver) and, between the data source and data sink, at least one intermediate station are present, control cells and ATM cells being transmitted during data transmission, and the control cells containing at least the fields CI (CI = Congestion Indication), NI (NI = No Increase) and ECR (ECR = Explicit Cell Rate), be developed to the effect that after receiving a signaling message with RIF_sig_ingress, during a call setup the intermediate station determines the value RIF_sig_egress, and this RIF matching is a function of the following parameters:

- a memory location value in the intermediate station (RIF_const)
- the largest possible number of ATM cells that can be sent (Nrm) per control cell by the transmitting device,
- the peak cell rate, which the transmitting device can never exceed (PCR = Peak Cell Rate),
- the sum of the delays from the data source to the data sink and back, (FRTT = Fixed Round-Trip

Time), and of a specific constant of the intermediate station that can assume values between 0 and 15 (Max_RIF).

In this case, the value of the peak cell rate (PCR) and/or of the sum of the delays from the data source to the data sink and back (FRTT) can be estimated or determined.

The value of the peak cell rate (PCR) and/or of the sum of the delays from the data source to the data sink and back (FRTT) can be estimated in the intermediate station with the aid of the incoming signaling message, based on the input values of PCR and/or FRTT.

Furthermore, the value of the peak cell rate (PCR) and/or of the sum of the delays from the data source to the data sink and back (FRTT) can be estimated in the intermediate station with the aid of the outgoing signaling message, based on the output values and/or the input values of PCR and/or FRTT.

The value of the peak cell rate (PCR) and/or of the sum of the delays from the data source to the data sink and back (FRTT) can be determined on the basis of experimental values in accordance with a prescribed link.

The value RIF_sig_egress, which specifies the power n of the defined RIF value RIF = $2^n/2^{15}$ and is forwarded by the intermediate station, can be smaller than or equal to the value RIF_sig_ingress that is received by the intermediate station in the signaling message.

If $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, the value RIF_sig_egress can be equated to the smaller of the two values of RIF_sig_ingress and Max_RIF. It is to be

noted in this case that the peak cell rate PCR is obtained in cells/s, while FRTT is obtained in μs.

Here, $\log_2$ represents the logarithm with the base 2, and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x.

The value RIF_sig_egress can be equated to 0 if $\lfloor \log_2(\text{RIF\_const}*\text{Nrm}/(\text{FRTT}*\text{PCR})^2) \rfloor \le 0$, in accordance with $(\text{FRTT}*\text{PCR})^2 > \text{RIF\_const}*\text{Nrm}/2$.

The value of RIF_sig_egress that is forwarded by the intermediate station can be reduced by 2 during a further call setup via the same link and given a doubling of the peak cell rate (PCR) if, for an invariable RIF_sig_ingress, before the doubling of the peak cell rate RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2, and other parameters are unchanged.

Furthermore, the value RIF_sig_egress that is forwarded by the intermediate station can be reduced by two when the FRTT value is twice as large in a further connection and other parameters are unchanged, if, for an invariable RIF_sig ingress, RIF_sig_egress < RIF_sig _ingress and Max_RIF > RIF_sig_egress ≥ 2.

The value of RIF_sig_egress that is forwarded by the intermediate station can increase by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling of Nrm RIF_sig_egress < RIF_sig_ingress and RIF_sig_egress < Max_RIF.

If the peak cell rate (PCR) and the delays from the data source to the data sink and back (FRTT) change in

such a way that the product FRTT*PCR does not vary, the value of RIF_sig_egress that is forwarded by the intermediate station can remain unchanged when RIF_sig_ingress and Nrm do not vary.

The value of RIF_sig_egress that is forwarded by the intermediate station can also remain unchanged when parameters other than the peak cell rate (PCR), the delays from the data source to the data sink and back (FRTT), and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device vary, and when RIF_sig_ingress does not vary.

The intermediate station can determine the value RIF_sig_egress using the following formulas:

$$RIF\_switch = \min(\max(0, \lfloor \log_2(RIF\_const*Nrm/(PCR\_egress*FRTT\_egress)^2) \rfloor), Max\_RIF) \quad (1)$$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

$$RIF\_sig\_egress = \min(RIF\_switch, RIF\_sig\_ingress), \quad (2)$$

where RIF_sig_ingress is the value that the intermediate station receives.

For an ABR connection, there exists a data stream in the direction from the data source to the data sink, the forward direction, and one in reverse, the backward direction. The ATM cells of an ABR connection pass the intermediate station in both directions of the connection i. For both directions of the connection i, the calculation of RIF_sig_egress can be executed

analogously with the aid of the parameters associated with the respective direction.

Particularly for the purpose of using the above-named method, the inventor proposes, moreover, to improve a transmission system in ABR traffic in an ATM data network, having at least one data source (transmitter), at least one data sink (receiver) and, between the data source and data sink, at least one intermediate station, control cells and ATM cells being transmitted during data transmission, and the control cells containing at least the fields CI (CI = Congestion Indication), NI (NI = No Increase) and ECR (ECR = Explicit Cell Rate), to the effect that it contains a means for matching an RIF parameter (RIF = Rate Increase Factor).

The means for matching the RIF parameter can advantageously be configured such that a program module that estimates or determines the value of the peak cell rate (PCR) and/or the sum of the delays from the data source to the data sink and back (FRTT) is provided in the intermediate station.

A program module that determines the value of the peak cell rate (PCR) and/or the sum of the delays from the data source to the data sink and back (FRTT) on the basis of experimental values in accordance with a prescribed link can be provided in the intermediate station.

A memory can be present in the intermediate station.

Furthermore, it is possible to provide in the intermediate station a program module which, if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, equates the value RIF_sig_egress to the smaller of the two values of RIF_sig_ingress and Max_RIF.

It is possible to provide in the intermediate station a program module which equates the value RIF_sig_egress that is forwarded by the intermediate station to 0 if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor \leq 0$, in accordance with $(FRTT*PCR)^2 > RIF\_const*Nrm/2$.

It is possible to provide in the intermediate station a program module that during a further call setup over the same link and given a doubling of the peak cell rate (PCR) reduces the value of RIF_sig_egress that is forwarded by the intermediate station by 2 if, for an invariable RIF_sig_ingress, before the doubling of the peak cell rate RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2, and other parameters are unchanged.

It is possible for there to be present in the intermediate station a program module that, when the value FRTT in a further connection is twice as large and other parameters are unchanged, reduces the value RIF_sig_egress that is forwarded by the intermediate station by two if, for an invariable RIF_sig_ingress, RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2.

Furthermore, it is possible to provide in the intermediate station a program module that increases the value of RIF_sig_egress that is forwarded by the intermediate station by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling of the Nrm value RIF_sig_egress < RIF_sig_ingress and RIF_sig_egress < Max_RIF.

It is possible for there to be present in the intermediate station a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress and Nrm do not vary, given a change in the peak cell rate (PCR) and the delays from the data source to the data sink and back (FRTT), in such a way that the product FRTT*PCR does not vary.

It is possible to provide in the intermediate station a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress does not vary, given a change in parameters other than the peak cell rate (PCR), the delays from the data source to the data sink and back (FRTT) and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device.

It is possible for there to be present in the intermediate station a program module that determines the value RIF_sig_egress using the following formulas:

$$RIF\_switch = \min(\max(0, \lfloor \log_2(RIF\_const * Nrm / (PCR\_egress * FRTT\_egress)^2) \rfloor), Max\_RIF) \quad (1)$$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

$$RIF\_sig\_egress = \min(RIF\_switch, RIF\_sig\_ingress) \quad (2)$$

where RIF_sig_ingress is the value that the intermediate station receives.

The overall result of the invention is the optimization of the utilization of capacity in ABR traffic.

Patent Claims

1. A method for matching an RIF parameter (RIF = Rate Increase Factor) in ABR traffic in an ATM data network with a multiplicity of connections, at least one data source (transmitter), at least one data sink (receiver) and, between the data source and data sink, at least one intermediate station being present, control cells and ATM cells being transmitted during data transmission, and the control cells containing at least the fields CI (CI = Congestion Indication), NI (NI = No Increase) and ECR (ECR = Explicit Cell Rate), characterized in that after receiving a signaling message with RIF_sig_ingress, during a call setup the intermediate station determines the value RIF_sig_egress, and this RIF matching is a function of the following parameters:
   - a memory location value in the intermediate station (RIF_const)
   - the largest possible number of ATM cells that can be sent (Nrm) per control cell by the transmitting device,
   - the peak cell rate, which the transmitting device can never exceed (PCR = Peak Cell Rate),
   - the sum of the delays from the data source to the data sink and back, (FRTT = Fixed Round-Trip Time), and of
   - a specific constant of the intermediate station that can assume values between 0 and 15 (Max_RIF).

2. The method as claimed in the preceding claim 1, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated or determined.

3. The method as claimed in the preceding claim 2, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated in the intermediate station with the aid of the incoming signaling message.

4. The method as claimed in one of the preceding claims 2 to 3, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is estimated [lacuna] the intermediate station with the aid of the outgoing signaling message.

5. The method as claimed in one of the preceding claims 2 to 4, characterized in that the value of the peak cell rate (PCR) and/or of the sum of the delays (FRTT) is determined on the basis of experimental values in accordance with a prescribed link.

6. The method as claimed in one of the preceding claims 1 to 5, characterized in that the value RIF_sig_egress, which specifies the power n of the defined RIF value RIF = $2^n/2^{15}$ and is forwarded by the intermediate station, is smaller than or equal to the value RIF_sig_ingress that is received by the intermediate station in the signaling message.

7. The method as claimed in one of the preceding claims 1 to 6, characterized in that if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, the value RIF_sig_egress that is forwarded by the intermediate station is equated to the smaller of the two values of RIF_sig_ingress and Max_RIF.

8. The method as claimed in one of the preceding claims 1 to 7, characterized in that the value RIF_sig_egress that is forwarded by the

intermediate station is equated to 0 if $\lfloor \log_2(\text{RIF\_const}*\text{Nrm}/(\text{FRTT}*\text{PCR})^2) \rfloor \le 0$, in accordance with $(\text{FRTT}*\text{PCR})^2 > \text{RIF\_const}*\text{Nrm}/2$.

9. The method as claimed in the preceding claim 8, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station is reduced by two during a further call setup via the same link and given a doubling of the peak cell rate (PCR) if, for an invariable RIF_sig_ingress, before the doubling of the peak cell rate RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2, and other parameters are unchanged.

10. The method as claimed in one of the preceding claims 8 to 9, characterized in that the value RIF_sig_egress that is forwarded by the intermediate station is reduced by two when the FRTT value is twice as large in a further connection and other parameters are unchanged, if, for an invariable RIF_sig_ingress, RIF_sig_egress < RIF_sig_ingress and Max_RIF > RIF_sig_egress ≥ 2.

11. The method as claimed in one of the preceding claims 8 to 10, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station increases by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling RIF_sig_egress < RIF_sig_ingress and RIF_sig_egress < Max_RIF.

12. The method as claimed in one of the preceding claims 8 to 11, characterized in that the value of

RIF_sig_egress that is forwarded by the intermediate station when RIF_sig_ingress and Nrm do not vary remains unchanged given a change in the peak cell rate (PCR) and the sum of the delays (FRTT) in such a way that the product FRTT*PCR does not vary.

13. The method as claimed in one of the preceding claims 8 to 12, characterized in that the value of RIF_sig_egress that is forwarded by the intermediate station when RIF_sig_ingress does not vary remains unchanged given a change in parameters other than the peak cell rate (PCR), the sum of the delays (FRTT) and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device.

14. The method as claimed in one of the preceding claims 1 to 13, characterized in that the intermediate station determines the value RIF_sig_egress using the following formulas:

$$RIF\_switch = \min(\max(0, \lfloor \log_2(RIF\_const*Nrm/(PCR\_egress*FRTT\_egress)^2) \rfloor), Max\_RIF)$$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

$$RIF\_sig\_egress = \min(RIF\_switch, RIF\_sig\_ingress),$$

where RIF_sig_ingress is the value that the intermediate station receives.

15. The method as claimed in one of the preceding claims 1 to 14, characterized in that for both directions of the connection i the calculation of

RIF_sig_egress is executed analogously with the aid of the parameters associated with the respective direction.

16. A transmission system in ABR traffic in an ATM data network, having at least one data source (transmitter), at least one data sink (receiver) and, between the data source and data sink, at least one intermediate station, control cells and ATM cells being transmitted during data transmission, and the control cells containing at least the fields CI (CI = Congestion Indication), NI (NI = No Increase) and ECR (ECR = Explicit Cell Rate), characterized in that it contains a means for matching an RIF parameter (RIF = Rate Increase Factor).

17. The transmission system as claimed in the preceding claim 16, characterized in that a program module that estimates or determines the value of the peak cell rate (PCR) and/or the sum of the delays (FRTT) is provided in the intermediate station.

18. The transmission system as claimed in one of the preceding claims 16 to 17, characterized in that a program module that determines the value of the peak cell rate (PCR) and/or the sum of the delays (FRTT) on the basis of experimental values in accordance with a prescribed link is provided in the intermediate station.

19. The transmission system as claimed in one of the preceding claims 16 to 18, characterized in that a memory is present in the intermediate station.

20. The transmission system as claimed in one of the preceding claims 16 to 19, characterized in that

present in the intermediate station is a program module that, if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor > Max\_RIF$, equates the value RIF_sig_egress that is forwarded by the intermediate station to the smaller of the two values of RIF_sig_ingress and Max_RIF.

21. The transmission system as claimed in one of the preceding claims 16 to 20, characterized in that present in the intermediate station is a program module that equates the value RIF_sig_egress that is forwarded by the intermediate station to 0 if $\lfloor \log_2(RIF\_const*Nrm/(FRTT*PCR)^2) \rfloor \leq 0$, in accordance with $(FRTT*PCR)^2 > RIF\_const*Nrm/2$.

22. The transmission system as claimed in one of the preceding claims 16 to 21, characterized in that provided in the intermediate station is a program module that during a further call setup over the same link and given a doubling of the peak cell rate (PCR) reduces the value of RIF_sig_egress that is forwarded by the intermediate station by 2 if, for an invariable RIF_sig_ingress, before the doubling of the peak cell rate $RIF\_sig\_egress < RIF\_sig\_ingress$ and $Max\_RIF > RIF\_sig\_egress \geq 2$, and other parameters are unchanged.

23. The transmission system as claimed in one of the preceding claims 16 to 22, characterized in that provided in the intermediate station is a program module that, when the value FRTT in a further connection is twice as large and other parameters are unchanged, reduces the value RIF_sig_egress that is forwarded by the intermediate station by two if, for an invariable RIF_sig_ingress, $RIF\_sig\_egress < RIF\_sig\_ingress$ and $Max\_RIF > RIF\_sig\_egress \geq 2$.

24. The transmission system as claimed in one of the preceding claims 16 to 23, characterized in that provided in the intermediate station is a program module that increases the value of RIF_sig_egress that is forwarded by the intermediate station by 1 given doubling of the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device in a further connection, other parameters being unchanged if, for an invariable RIF_sig_ingress, before the doubling RIF_sig_egress < RIF_sig_ingress and IF_sig_egress < Max_RIF.

25. The transmission system as claimed in one of the preceding claims 16 to 24, characterized in that provided in the intermediate station is a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress and Nrm do not vary, given a change in the peak cell rate (PCR) and the sum of the delays (FRTT), in such a way that the product FRTT*PCR does not vary.

26. The transmission system as claimed in one of the preceding claims 16 to 25, characterized in that provided in the intermediate station is a program module that leaves the value of RIF_sig_egress that is forwarded by the intermediate station unchanged when RIF_sig_ingress does not vary, given a change in parameters other than the peak cell rate (PCR), the sum of the delays (FRTT) and the number of ATM cells that can be sent (Nrm) per control cell by the transmitting device.

27. The transmission system as claimed in one of the preceding claims 16 to 26, characterized in that provided in the intermediate station is a program

module that determines the value RIF_sig_egress using the following formulas:

$$RIF\_switch = \min(\max(0, \lfloor \log_2(RIF\_const * Nrm / (PCR\_egress * FRTT\_egress)^2) \rfloor), Max\_RIF)$$

where $\log_2$ represents the logarithm with the base 2 and $\lfloor x \rfloor$ represents the largest integer smaller than or equal to x, and

$$RIF\_sig\_egress = \min(RIF\_switch, RIF\_sig\_ingress),$$

where RIF_sig_ingress is the value that the intermediate station receives.

Abstract

Transmission system and a method for matching an RIF parameter in ABR traffic

The invention relates to a transmission system and a method for matching an RIF parameter (RIF = Rate Increase Factor) in ABR traffic.

The invention is distinguished in that during a call setup the RIF matching is a function of the following parameters: a memory location value (RIF_const), the largest possible number of ATM cells that can be sent (Nrm) per control cell by the transmitting device, the peak cell rate (PCR), the sum of the delays (FRTT), and of a specific constant of the intermediate station (Max_RIF).

Declaration and Power of Attorney For Patent Application
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Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

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ÜBERTRAGUNGSSYSTEM UND VERFAHREN ZUR ANPASSUNG EINES RIF-PARAMETERS BEI ABR-VERKEHR

deren Beschreibung

(zutreffendes ankreuzen)
☐ hier beigefügt ist.
☒ am 31.08.2000 als
PCT internationale Anmeldung
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eingereicht wurde und am _______
abgeändert wurde (falls tatsächlich abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

TRANSMISSION SYSTEM AND METHOD FOR MATCHING AN RIF-PARAMETER IN ABR-TRAFFIC

the specification of which

(check one)
☐ is attached hereto.
☒ was filed on 31.08.2000 as
PCT international application
PCT Application No. PCT/DE00/02976
and was amended on __________
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign appplications Priorität beansprucht			Priority Claimed	
19942158.7 (Number) (Nummer)	DE (Country) (Land)	03.09.1999 (Day Month Year Filed) (Tag Monat Jahr eingereicht)	☒ Yes Ja	☐ No Nein
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	☐ Yes Ja	☐ No Nein
(Number) (Nummer)	(Country) (Land)	(Day Month Year Filed) (Tag Monat Jahr eingereicht)	☐ Yes Ja	☐ No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozeßordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35. United States Code. §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occured between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No.) (Anmeldeseriennummer)	(Filing Date D, M, Y) (Anmeldedatum T, M, J)	(Status) (patentiert, anhängig, aufgegeben)	(Status) (patented, pending, abandoned)
PCT/DE00/02976	21.08.2000	anhängig	pending
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date D,M,Y) (Anmeldedatum T, M; J)	(Status) (patentiert, anhängig, aufgeben)	(Status) (patented, pending, abandoned)

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German Language Declaration

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